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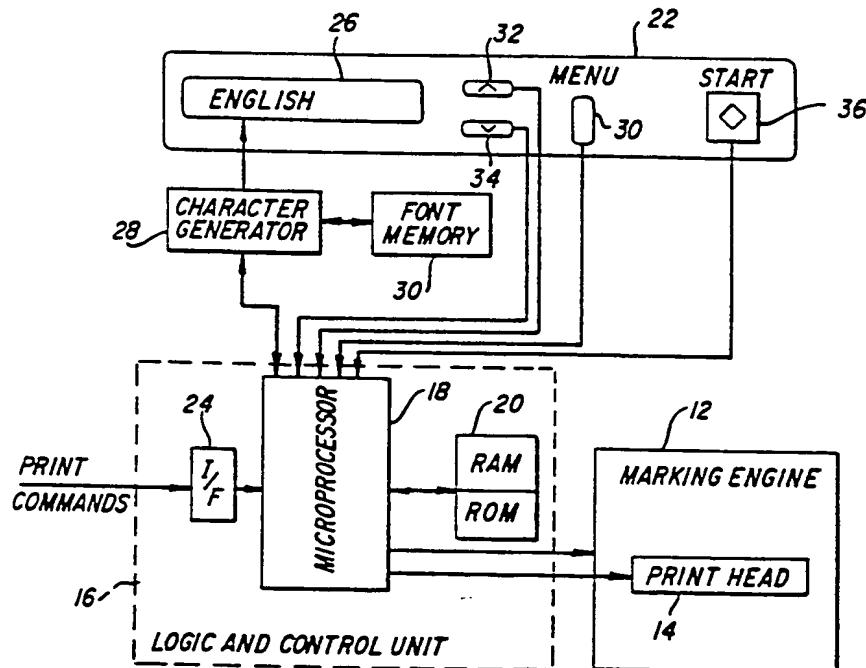
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amendments.*

(54) Title: MULTI-LINGUAL OPERATOR CONTROL PANEL



(57) Abstract

An operator interface for apparatus such as a printer or copier includes an operator control panel having an alphanumeric display for displaying a plurality of messages to an operator, a character generator responsive to codes representing messages to be displayed on the display for generating control signals for said display; a memory for storing codes representing the plurality of messages in a plurality of languages; and means responsive to an operator input for selecting one of the plurality of languages for displaying the messages.

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MULTI-LINGUAL OPERATOR CONTROL PANEL

Technical Field of the Invention

The present invention relates to an operator interface for apparatus, and more particularly to an 5 operator interface having an alphanumeric display on an operator control panel.

BACKGROUND OF THE INVENTION

It is known to provide an operator interface for apparatus such as a copier, printer or FAX machine 10 which includes an operator control panel having means for displaying a variety of messages to an operator such as machine status, error messages, number of copies requested, number of copies in progress, machine configuration, and operator instructions and 15 prompts. To reduce the number of separate components on the operator control panel, it is also known to provide an alphanumeric display such as a liquid crystal display (LCD), and associated buttons to select options and respond to prompts provided on the 20 display.

For example, the Hewlett-Packard LaserJet Series II™ laser printer is provided with such a display. Conventionally, the control panel is programmed to display operator messages in the 25 language employed by a large segment of the market (e.g. English in the U.S.). Operators who speak a language other than the majority must learn to understand the messages. Furthermore, apparatus sold in different markets must be programmed for the 30 majority language in the given market, thereby limiting the ease with which apparatus manufactured for one market can be shifted to another when commercial conditions demand.

It is therefore the object of the present 35 invention to provide an operator interface for

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apparatus, and particularly for a copier, printer or FAX machine, that is free of the shortcomings noted above.

SUMMARY OF THE INVENTION

5 The object is achieved according to the present invention by providing an operator interface having an operator control panel including an alphanumeric display for displaying a plurality of messages. A character generator responsive to codes representing messages to be
10 displayed on the alphanumeric display generates control signals for driving the display. Codes for generating each message in a plurality of languages are stored in a memory. An operator selects the language in which the messages are to be displayed, and the messages are
15 generated in the selected language. In one mode of practicing the invention, the operator interface is in a printer having a marking engine, and a logic and control unit for controlling the marking engine. The codes are stored in a memory associated with the logic and control
20 unit. In an alternative mode, the printer includes a raster image processor for driving the working engine, and the codes for the messages are stored in a memory associated with the raster image processor.

DESCRIPTION OF THE DRAWINGS

25 FIG. 1 is a schematic block diagram of a printer having an operator interface according to the present invention;

· FIG. 2 is a schematic diagram illustrating the operation of the printer shown in FIG. 1 to select a
30 language for display on the operator control panel;

· FIG. 3 is a schematic diagram illustrating one mode of storing operator messages in the memory of the printer;

· FIG. 4 is a schematic diagram illustrating an
35 alternative mode of storing messages in the printer

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memory; and

FIG. 5 is a schematic block diagram of a printer illustrating an alternative mode of practicing the present invention.

5 MODES OF CARRYING OUT THE INVENTION

Referring to FIG. 1, apparatus such as a computer output printer, includes a marking engine 12 having a print head 14. The marking engine may comprise for example an ink jet printer or a laser or LED 10 electrophotographic printer. A microprocessor based logic and control unit 16, including a microprocessor 18 and associated random access (RAM) and read-only (ROM) memory 20 receives inputs from operator control panel 22 and controls the operation of the marking engine 12. The 15 logic and control unit 16 receives print commands from an external source such as a personal computer (not shown) via a host computer interface port 24. The print commands include, for example, coded alphanumeric character data such as ASCII commands, and/or graphic commands for 20 producing graphic primitives. In response to the print commands, the LCU 16 retrieves a bit map representation for a character from the ROM portion of the memory 20. The bit map data is appropriately formatted by the 25 microprocessor 18 and sent to the print head 14 of the marking engine 12 to produce the printed characters.

The operator control panel 22 includes an alphanumeric display 26, such as a liquid crystal display panel, for displaying operator instructions and machine status. The characters displayed on the display 26 are 30 generated by a character generator 28 associated with the operator control panel 22, the character generator 28 receives message commands coded for example in ASCII code from the microprocessor 18 in the LCU 16. Coded message commands are retrieved by the microprocessor 18 from the 35 ROM portion of memory 20 where they are stored. When the

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character generator 28 receives a coded message command from the logic and control unit, it retrieves a bit map representation of the coded message from a font memory 29 associated with operator control panel 22, and drives the 5 elements of the display 26 with the retrieved bit map signals.

The operator control panel 22 also includes a menu switch 30 for selecting functions to be controlled from the operator control panel, a pair of up/down scroll 10 switches 32 and 34 for scrolling messages on the display 26, and a start switch 36. Switches 30-36 provide input signals to the LCU 16 from the operator control panel 22.

Generally, after turning the machine on with the start switch 36, an operator selects a function to be 15 controlled, such as the number of copies to be printed, by actuating the menu switch 30. The function to be controlled is then displayed on the display 26 and the state of the function to be controlled is selected by actuating an up/down scroll switch 32 or 34. Actuation of 20 the scroll switches may scroll through a list of options which are displayed on the display 26 or may increment or decrement the displayed count such as number of copies to be printed.

Normally, the LCU 16 uses a set of default 25 parameters to control the printer that are stored in the memory 20, or a set of parameters that were previously set by a user. The display 26 will be in the language specified by the default parameter, or that previously chosen by a user. Language selection appears on a menu 30 selection addressed by the menu switch 30. In the event that the language displayed is not understood by the operator, the instruction manual, which is written in a plurality of languages, also instructs the user how to choose the language displayed by the display 26. 35 Instructions in the manual direct the user to select a

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different language by actuating the menu switch 30 a prescribed number of times. In response, the display 26 will display the name of the currently selected language written in that language.

5 Further instructions in the manual direct the user to actuate the up/down scroll switches 32 and 34 to scroll through the language options. The name of each language is displayed, written in its own language. When the desired language is displayed, the user selects the
10 language by actuating the menu switch 30. The LCU 16 notes the newly selected language, and subsequently displays the operator instructions in that language until the user changes it again.

FIG. 2 is a schematic diagram illustrating the
15 display language selection process. Initially, after the printer is turned on, the control panel reads "Ready, copies requested...1" (100). The operator actuates the menu switch 30 the prescribed number of times (102), and the name of the current language selection, written in
20 that language is displayed (104). The operator then actuates the up/down scroll switches (106) to display the desired language selection. When the desired language is displayed, the operator actuates the menu switch (108) and the control panel display is returned to the initial
25 display "Ready, copies requested...1" (100). The operator then continues to configure or operate the apparatus in his chosen language.

As noted above, the coded messages for display are stored in the memory 20. FIG. 3 illustrates one way
30 of storing the messages in memory 20. For example, each message can be stored successively in each language. A particular message in a chosen language is addressed by the LCU by specifying the message address and adding an offset corresponding to the chosen language to the low
35 order bits of the message. For example, as shown in FIG.

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2 if the second message is to be displayed and the chosen language is German (displayed as DEUTCH), an offset of 2 is added to address of message number 2. Alternatively, as shown in FIG. 4, all the messages in a given language 5 may be listed sequentially and an offset corresponding to the chosen language added to the high order bits of the address. The first method described above facilitates the addition of further messages without the necessity of rearranging the previous messages. The second method 10 described above facilitates the addition of further languages without rearranging the previous messages. In either case, the LCU 16 stores the offset for the selected language in the RAM portion of memory 20 and applies that offset until it is changed by another user.

15 In a preferred embodiment of the invention, part of the memory 20 is nonvolatile programmable memory such as electronically erasable programmed read only memory (EE PROM) into which codes for further messages in further languages can be down loaded from the port computer and 20 permanently stored.

In the embodiment described with reference to FIG. 1 the printer is a rather low speed printer, since the task of operating the marking engine driving the print head and driving the display on the operator control panel 25 are all shared by the single microprocessor 18. Furthermore, the number of messages and languages that can be provided is limited by the size of the ROM portion of the memory 20.

In a further improvement to the present 30 invention, a high speed printer is provided with a separate raster image processor for generating the signals that drive the print head in the marking engine. This separate raster image processor is configured to send messages to the LCU to be displayed on the operator 35 control panel. By employing the separate raster image

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processor to drive both the print head and send messages to the operator control panel via the LCU, the number of messages can easily be expanded without overburdening the ROM portion of the LCU memory.

5 FIG. 5 shows a printer according to the alternative embodiment, where similar elements are numbered similarly to FIG. 1. The printer includes a raster image processor (RIP) 40 that receives coded print commands from an external source, generates the bit map patterns to produce the desired characters and drives the print head 14. The raster image processor 40 includes a microprocessor 42, associated RAM and ROM memory 44, the host computer interface port 24, a logic and control unit interface 46 and a print head driver 48. The parts of the
10 raster image processor 40 communicate via bus 50. The memory 44 contains the bit map fonts for the printer and the coded operator control messages for the control panel 22. In operation, when the LCU needs to display a message, it requests the desired message from the RIP 40
15 and the RIP provides the appropriate display string to the LCU 16 via LCU interface 46. When the RIP needs to display a message, it instructs the LCU to display the provided string. The LCU supplies the display string to the character generator 28 to display the message on
20 display 26 in the selected language.
25

As a further alternative, the RIP 40 interfaces directly with display panel 22, as shown by the dashed lines in Fig. 5. The RIP 40 sends the display strings to the character generator directly. The LCU 16 is not involved in the process. If the LCU needs to display a message, it simply informs the RIP of the message number to display (not actually transmitting the string), and the RIP transfers the display string directly to the character generator. This arrangement further frees the LCU to
30 perform control functions.
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Although the present invention has been described with reference to a computer output printer, it will be understood that the principals of the invention may be applied to any apparatus having a computer controlled operator interface with an alphanumeric display panel. Such an interface can be particularly useful in a copier or a fax machine.

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Claims:

1. An operator interface for apparatus comprising:

5 (a) an operator control panel (22) having an alphanumeric display for displaying a plurality of messages to an operator;

(b) a character generator (28) responsive to codes representing messages to be displayed on the display
10 for generating control signals for said display;

(c) memory means (20) for storing codes representing said messages,

said interface being characterized in that said messages are stored in a plurality of languages in said
15 memory means and in that it further comprises means (16) responsive to an operator input for selecting one of said plurality of languages for displaying said messages.

2. The operator control panel claimed in claim 1 for use in a printer having a marking engine for marking
20 an image on paper and a logic and control unit for receiving inputs from the operator control panel and controlling the marking engine and the display on the operator control panel, and wherein said memory means is connected to said logic and control unit.

25 3. The operator control panel claimed in claim 1 for use in a printer having a marking engine for marking an image on a page, a raster image processor for generating bit map signals for driving the marking engine, and logic and control means for controlling the operation
30 of the marking engine and the raster image processor, and wherein said memory means is connected to said raster image processor.

4. The operator control panel claimed in claim 2 or 3, wherein said codes representing said messages are
35 stored in tables in said memory means, each of said tables

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containing a message in each of said plurality of languages, and wherein said logic and control means specifies a message to be displayed by addressing a particular table and wherein said means responsive to an operator input adds an offset to the low order bits of said table address.

5. The operator control panel claimed in claim 2 or 3 wherein said codes representing said messages are stored in tables, each table containing all of said 10 messages in a particular language, and wherein said logic and control means specifies a message to be displayed by specifying the address of a relative location within a table and said means responsive to an operator input specifies an offset added to the high order bits of said 15 address to specify one of said tables.

6. The operator control panel claimed in claim 1 further including nonvolatile memory means for receiving and storing downloaded codes for messages in further languages.

20 7. The operator control panel claimed in claim 1, further including a menu switch for selecting a function to be controlled from said control panel, and scroll switch means for scrolling through a list of options on the display, and wherein said means responsive 25 to an operator input responds to actuation of said menu switch to display a list of languages written in the respective languages, and responsive to actuation of said scroll switch means to scroll through said list.

8. A method of controlling an operator 30 interface of the type claimed in claim 1, comprising the steps of:

- a) providing an instruction manual written in the plurality of languages, instructing the operator to actuate said selecting means; and
- 35 b) actuating said selecting means according to said instructions.

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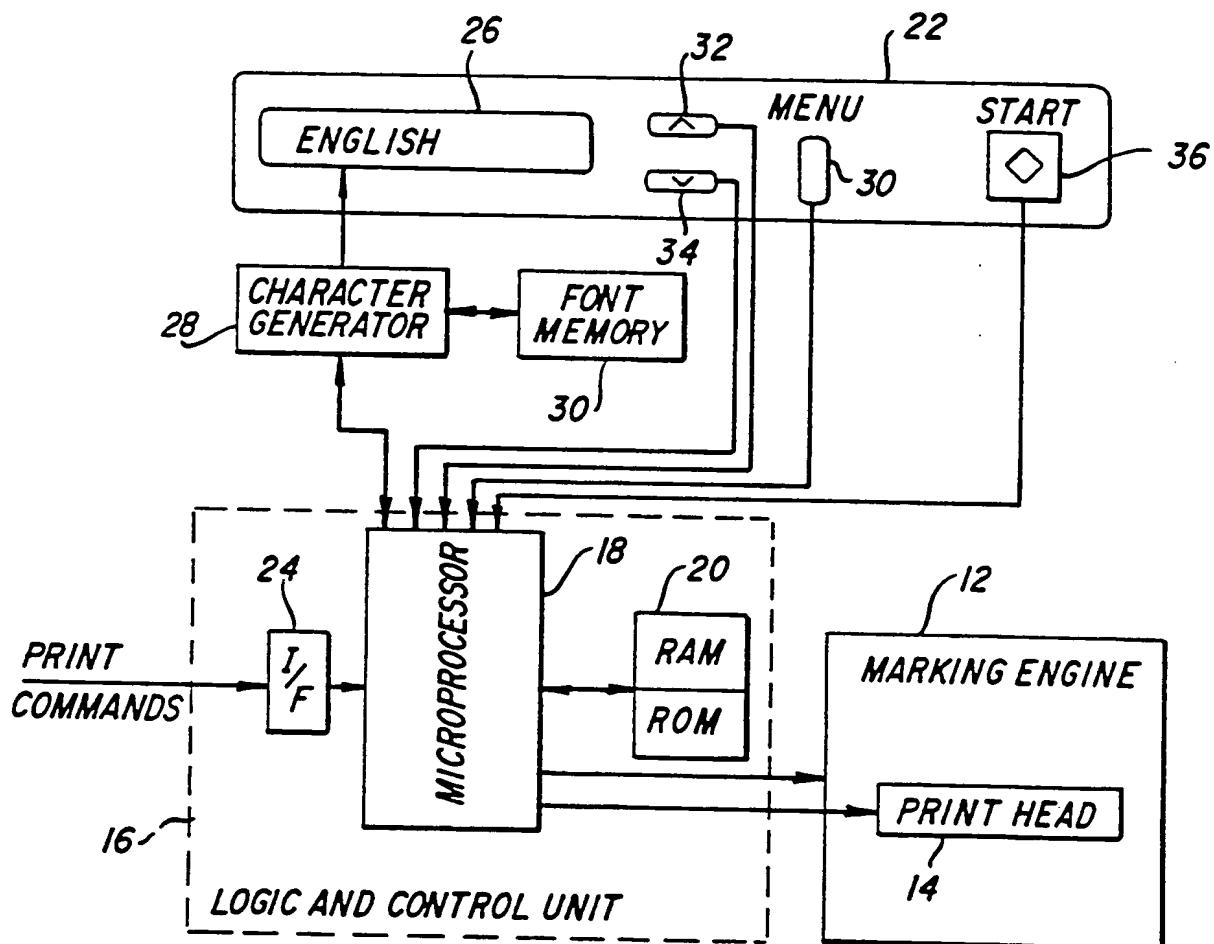


FIG. 1

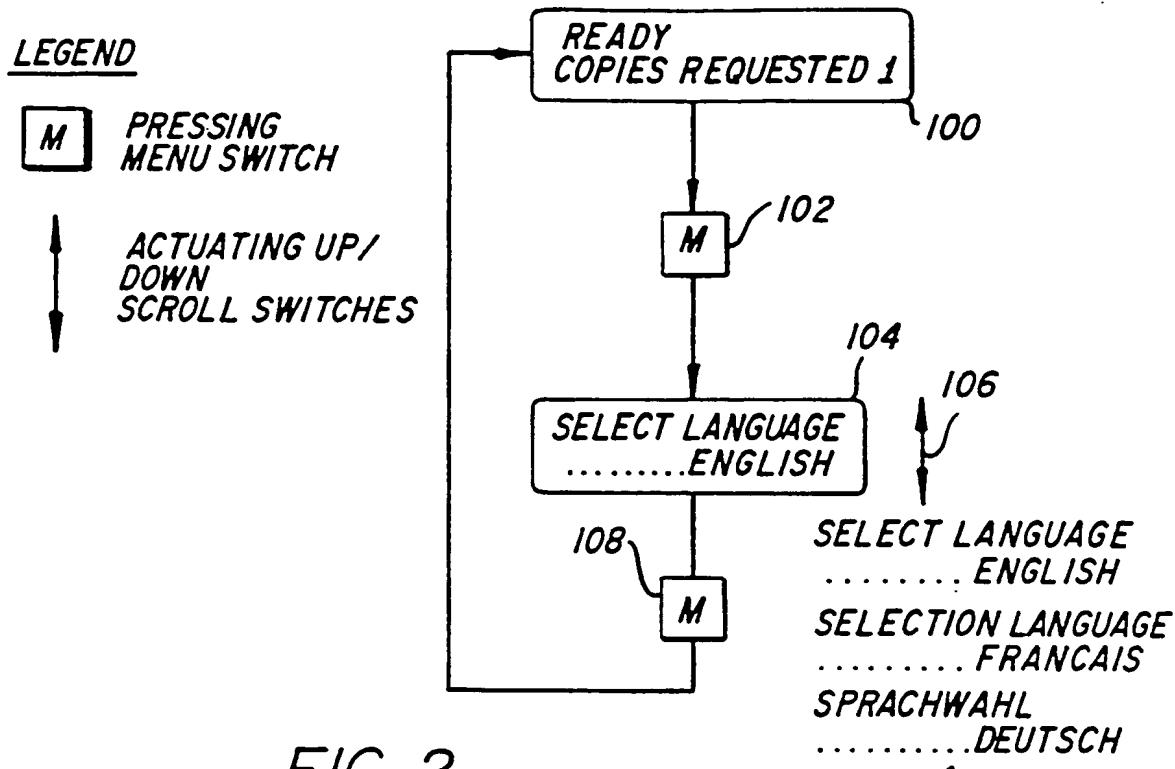
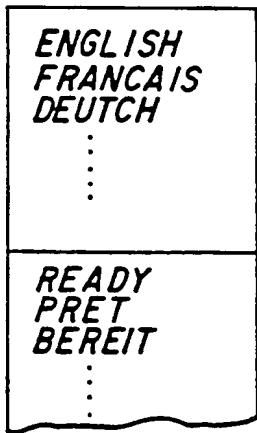


FIG. 2

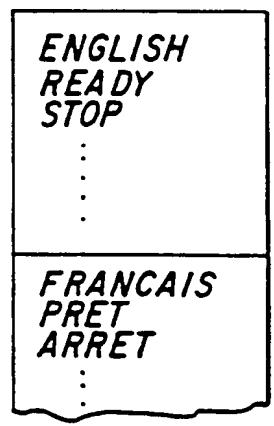
OFFSET

0
1
2
⋮
0
1
2
⋮

MESSAGE No. 1

MESSAGE No. 2

OFFSET

0
1
⋮

ENGLISH

FRENCH

FIG. 3

FIG. 4

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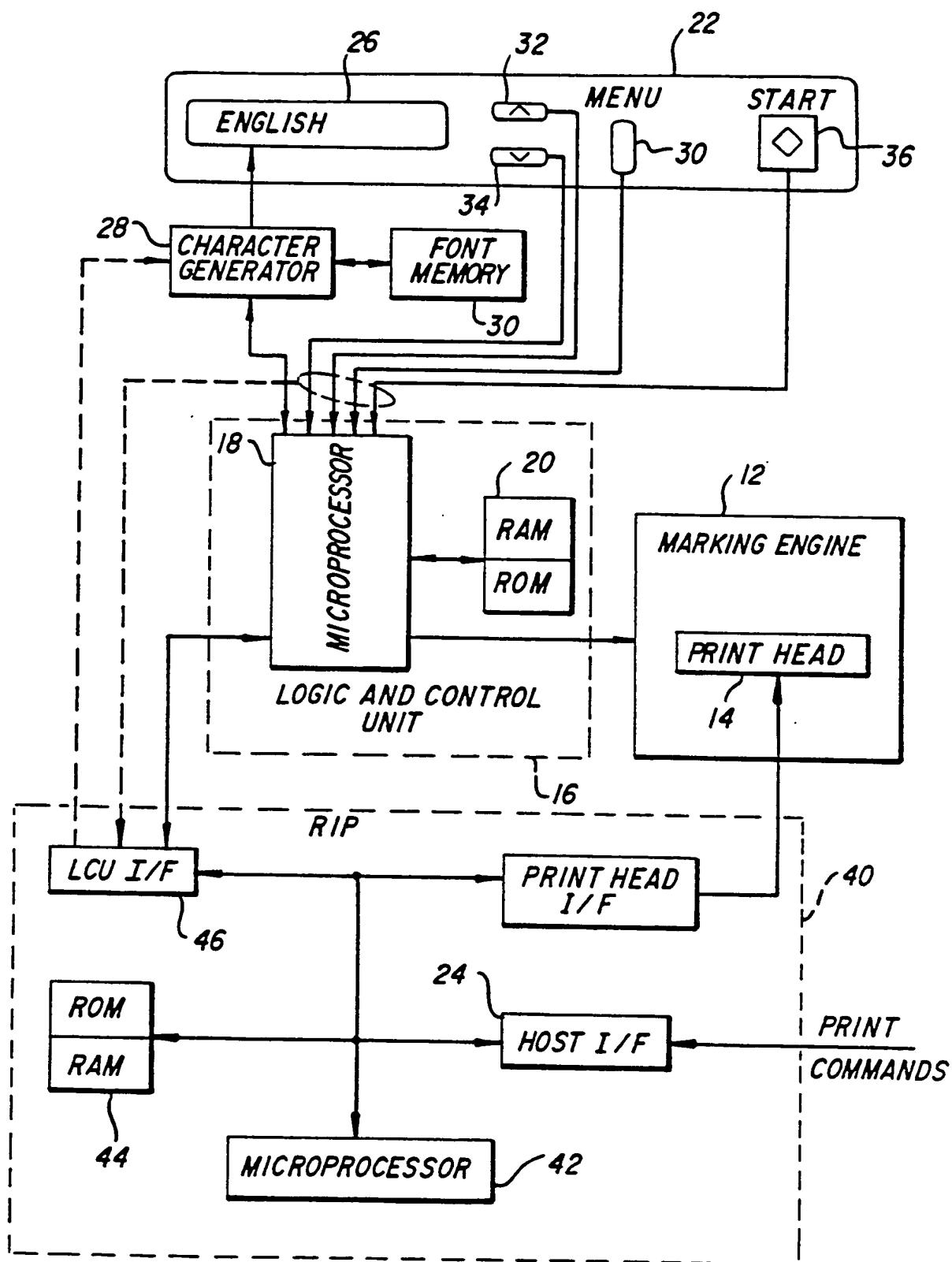


FIG. 5

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US 90/01929

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) *

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC⁵: G 06 F 3/023

II. FIELDS SEARCHED

Minimum Documentation Searched ?

Classification System	Classification Symbols
IPC ⁵	G 06 F 3

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched *

III. DOCUMENTS CONSIDERED TO BE RELEVANT *

Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. 13
X	US, A, 4365315 (DONALD J. JAMNIK) 21 December 1982 see the whole document	1, 6
A	--	2-5, 7
A	DE, A, 3317952 (FUJI XEROX CO.) 24 November 1983 see the whole document	1-7
A	Research Disclosure, February 1984, page 54, disclosure no. 23823: "Multi-lingual display", see the whole document	1-7

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

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IV. CERTIFICATION

Date of the Actual Completion of the International Search

20th July 1990

Date of Mailing of this International Search Report

29.08.90

International Searching Authority

EUROPEAN PATENT OFFICE

Signature of Authorized Officer

H. DANIELS

ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.

US 9001929
SA 36280

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 22/08/90. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4365315	21-12-82	EP-A,B 0047414 JP-A,B,C57081633	17-03-82 21-05-82
DE-A- 3317952	24-11-83	JP-A- 58199388 GB-A,B 2121574	19-11-83 21-12-83